You must complete this exam within 45 minutes. No calculators allowed.

1. Find numbers \( a \) and \( b \) such that \((2^a)^b \neq 2^{a+b}\).

2. Simplify: \(\sqrt{20n^{12}m^4} = ?\)

3. Simplify: \(7a - 2(b - 5) + 5(2 - a) = ?\)

4. Simplify: \(\frac{12n^3m^2 + 9n^4m^3}{3n^2m^2} = ?\)

5. Simplify: \(\frac{4w - 2}{5w^3} \cdot \frac{10w}{2w^2 - w} = ?\)

6. \(y = (2y + 1)/y, \quad y^{-1} = ?\)

7. Write as one fraction. \(\frac{1}{a^2} - \frac{1}{2} = ?\)

8. Solve for \(x: x + 1 = 2x^2\).

9. \(g(x) = \frac{2-x}{x-3}, \quad g(-5) = ?\)

10. \(16^{1/4} \cdot 9^{3/2} = ?\)

11. Where is the function pictured \(> 0\)?

12. Find the coordinates \((x, y)\) of the point of intersection of the graphs of \(x - 3y = 1, \quad 2x - 5y = 3\).

13. Find the slope of the line \(3x + 4y = 6\).

14. Find the surface area of the top and bottom of a box (rectangular solid) with height \(h\), length \(l\) and width \(w\).

15. Graph \(y = -x^2 + x + 2\).

16. Graph \(|1 - x|\).

17. \(f(x) = 2^x - x^{-3}, \quad f(-1) = ?\)

18. Solve for \(x. \quad \log_2(x + 5) = 3\).

19. Graph \(f(x) = (1/2)^x\).
20. If $2^{10}$ is approximately equal to $10^3$, then find the power of 10 which is nearest to $2^{60}$.

21. Find the distance between the following points of the plane: $P = (-1, 2)$ and $Q = (-2, -1)$.

22. $f(x) = \sqrt{x-1}$, $f(x^2) = ?$

23. Write $t$ in terms of $x$. $x = e^{1-3t}$.

24. Find a function involving logarithms which has one root, $x = -1$, and has one vertical asymptote, $x = 0$.

25. Graph $y = -\frac{1}{2}x + 4$.

26. $f(x) = \frac{x}{1-x}$, $f(f(x)) = ?$

27. Solve for $y$. $|3 - y| < 4$.

28. Find $g(f(x))$ where $f(x) = x^2$, $g(x) = x + 1$.

29. $f(x) = \frac{x}{2-x}$. For which $x$ is $f(x) = 3$?

30. Find the domain of $f(x) = x/\sqrt{x-1}$.

31. $\sin(\pi/2) = ?$

32. Simplify: $\tan \theta \cos \theta$

33. Simplify: $\sin \theta \tan \theta + \cos \theta$

34. $\cos(C) = 2/3$, $b = 3$. Find $a$.

35. Graph over one period which starts with 0. $\sin(x/2)$
1. $a = 1, b = 1$
2. $2n^6 m^2 \sqrt{5}$
3. $2a - 2b + 20$
4. $4n + 3n^2 m$
5. $\frac{4}{w^3}$
6. $y/(2y + 1)$
7. $\frac{2 - a^2}{2a^2}$
8. $x = -1/2, 1$
9. $-7/8$
10. 54
11. $-4 < x < 2$
12. (4, 1)
13. $-3/4$
14. 2wl
15.
16.
17. 3/2
18. $x = 3$